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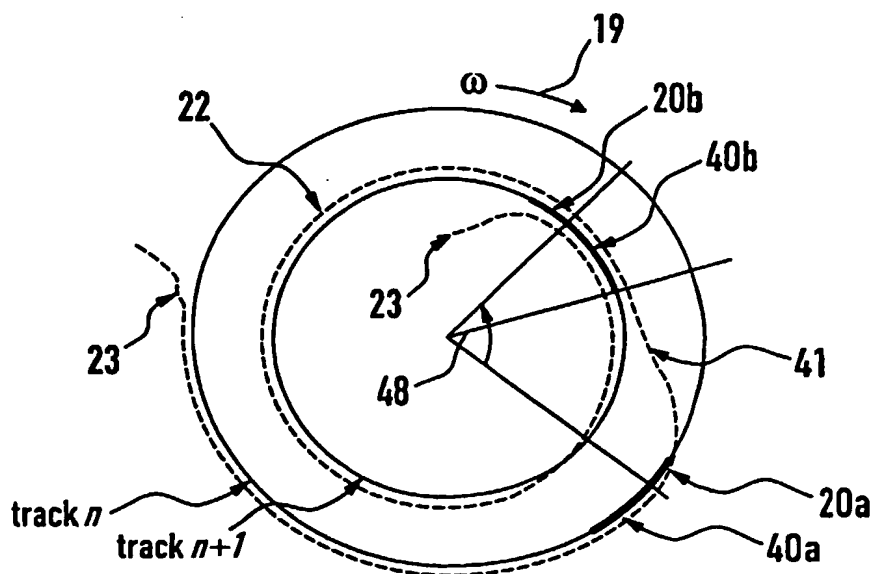
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[Continued on next page]

(54) Title: DATA STORAGE APPARATUS AND METHOD FOR HANDLING A DATA STORAGE APPARATUS



(57) Abstract: Real-time audio video applications require guaranteed request service times from a hard disc drive. This requirement is not always fulfilled due to some unexpected delays in service times. One of the causes of such delay is the replacement of defective or bad sectors. By putting spare sectors on each track and extending the track skew in combination with read-and-write-on-arrival strategies it is possible to prevent extra delays in service times due to replacement of sectors.



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International Patent No.
PCT/IB 02/05689

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G11B20/18 G11B20/12 G11B27/10 G06F3/06 G11B20/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G11B G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| X | US 6 341 045 B1 (HIRONAKA HISAKAZU ET AL) 22 January 2002 (2002-01-22) column 3, line 57 - line 67 ----- | 1-3 |
| X | US 6 226 441 B1 (CONTRERAS JOHN M ET AL) 1 May 2001 (2001-05-01) column 47, line 18 - line 46 ----- | 1-3 |
| X | US 5 271 018 A (CHAN LITKO) 14 December 1993 (1993-12-14) column 2, line 12 - line 30 column 5, line 34 - line 51 column 6, line 60 - line 64 ----- | 1-3 |
| X | EP 1 017 055 A (SAMSUNG ELECTRONICS CO LTD) 5 July 2000 (2000-07-05) paragraph '0003! paragraph '0020! ----- | 1 |

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
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- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

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INTERNATIONAL SEARCH REPORT

International application No.
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Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-3

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-3

*problem: reaching a trade off between performance and capacity loss.

*solution: number of spare sectors comprised in the spare area array.

2. claims: 4-7 9-12

*problem: enabling data transfer within the maximum service time.

*solution: a format allowing the spare area to be passed under the read/write head at least once before a track switch.

3. claim: 8 13 14

*problem: preventing extra delays in the service time by applying a transfer-on-arrival strategy.

*solution: controlling the data transfer by a controller.

INTERNATIONAL SEARCH REPORT

Information on patent family members

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